

AUGUST
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Amateur Radio

JOURNAL OF
THE WIRELESS
INSTITUTE OF
AUSTRALIA

For the Experimenter
and Radio Enthusiast



9_{D.}

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An illustration of a vacuum tube with a human-like face. The tube has two large circular eyes and a triangular nose. A hand is shown plugging a pin into the bottom of the tube. Another hand is shown holding a small electronic component. Musical notes are floating around the tube. The text "It's the valve that makes the music" is written diagonally across the right side of the tube. The word "PHILIPS" is written in large, bold, capital letters at the bottom right of the illustration.

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EDITORIAL**"LEST WE FORGET"**

Comes the month of August each year and minds turn back to memories of the war years, 1939-1945, when a great many of the Amateurs of Australia were in uniform serving their king and country in the grimest war the history of mankind has ever known.

We think of those war years in the month of August because it was in this month, 1945, that victory in the Pacific was an accomplished fact, signalling the cessation of hostilities and the expectation of a prolonged peace throughout the nations of the earth.

Looking back over those grim years we recall times of hard work, of sometimes long arduous hours on duty, of drilling, marching, training, of the more pleasant times during hours of relaxation or days spent on leave, and the social and entertainment side of service life.

But above all we recall the friendships we made with men from all walks of life who had given up their professions and occupations to join forces in the common cause in defence of democracy; of men who shouldered to shoulder suffered the pangs of hunger and thirst, encountered

untold dangers; were in need of our friendship as indeed we were in need of theirs; of men who died that we and the people of our country might live on in peace.

It is of these men—Amateurs who paid the supreme sacrifice—that we think most at this time, and in our humble way honor their memory by our Remembrance Day Contest.

Every year this Contest is organized by the W.I.A. over the week-end in August nearest to the fifteenth of the month to perpetuate the memory of our gallant members and fellow Amateurs who passed to the great beyond in the service of their country.

The rules are simple and appear elsewhere in this issue for all those who can participate. You are asked to do so even if only for half an hour as a mark of respect.

"They gave their lives. For that public gift, they received a praise which never ages and a tomb most glorious—not so much the tomb in which they lie, but that in which their fame survives, to be remembered for ever when occasion comes for word or deed . . ."

FEDERAL EXECUTIVE.

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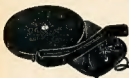
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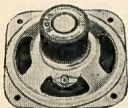
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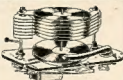
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AN ALL-BAND TANK CIRCUIT

BY R. S. CHOATE,* VK6RK

Those Amateurs who like an all-band transmitter and have run into the problem of band switching or plug-in coils, may be interested in this circuit which has been in operation in my transmitter for some time. The scheme is modified from an all-band final and coupling system which appeared in "QST" some time ago and later in the A.R.R.L. Handbook. It is very simple and it can be used for any pair of bands 1: 80-40 and 20-10, or say 40-20 and 10-6, etc. It takes up little space, little can go wrong with it, and it can be easily adapted for portable work.

Referring to Fig. 1 it will be seen that V1 is a driver tube which will normally be a doubler or tripler. The plate circuit of V1 and grid circuit of V2 and V3 consists of the network L1 L2 and C1 and C2.

Assuming that the transmitter is for 80-40-20-10 bands, the circuit works as follows: If an 80 metre signal is placed on the grid of V1, C2 is rotated to near maximum capacity and resonates coil L1 to 3.5 Mc. At near minimum capacity, it will resonate L1 to 7 Mc. providing of course that L1 is of suitable value. Injecting a 7 Mc. signal on V1, or a 14 Mc. signal, C2 will resonate L3 to 14 Mc. at near full capacity and to 28 Mc. at near minimum capacity. There will, of course, be other resonances on both coils which will vary according to the input frequency, and in the initial stages a wave meter check is necessary to select the right resonances.

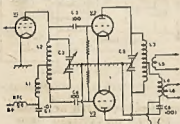


Fig. 1.

Now when resonances occur with L1 C2, the condenser C2 being a two gang or split stator, tunes L1 in parallel and the coil L2 acts merely as connections from the "hot" end of C2 to the coil L1. The current will be in phase opposition in L2 and will therefore cancel any r.f. in this coil on that frequency. On 20 and 10, the coil L2 and condenser C2 resonate with the two halves of C2 in series and inductance L1 becomes an r.f.c. of small value connecting the h.t. to the centre point of L2. Thus the drive on V2 and V3 is in parallel on 80 and 40 and in push-pull on 20 and 10.

The same applies to the output circuit, C5 L3 and L4. Here C5 resonates L3 in push-pull on 20 and 10, and resonates L4 on 80 and 40. Output for 20 and 10 is taken by a link at the centre of L3 and output for 40 and 80 by link at the "cold" end of L4. L5 in Fig. 1 being the 10-20 link, and L6 the link for 40 and 80.

An additional modification can be made to the output circuit by replacing C6 with a large variable condenser and coupling an odd length of wire to the junction of this condenser and L4. This will give a pi output circuit on 40 and 80 for portable work.

Dimensions for the coils and values for the tuning condensers are not given purposely. The split stators or two gangs have to be sufficiently large to resonate the coils for two bands in each case. The coils will have to be chosen to fit and, in particular, harmonically related resonance points should not coincide. That is the resonance point for 40 and 10 should be moved as far as possible from each other by pruning the coils.

The circuit is excellent for c.w. or for n.b.f.m. On phone, the L/C ratios are

not optimum, but in practice works quite OK. The tubes can be anything of course, but it is better to use tubes such as 829 or 815 or 807s. If triodes are used, and there is no reason why they should not be, then ordinary "cross over" neutralisation will take care of the push-pull aspect and link neutralisation for the 80-40 system between L1 and L4.

All of the usual items, such as metering, screen by-pass, and feed, etc., have been left out so as not to confuse the issue. In any case, they will vary according to the tubes used. I use a pair of 807s and 6BO has a pair of 6M5s in a nice little portable rig for 6 and 40. Of course one tube only in the final will work quite OK.

Note that on the lower frequencies, coils are tuned in "parallel," and the higher frequency ones in "push-pull," the values of L1 and L2 are about 2:1 in inductance.

SUNSPOTS AND DX

BY J. A. GAZARD,† VK5JG

Back in 1947 and 1948 even the new Amateur equipped with an 807 final, plus a "piece of wire" for an antenna, could work DX on 14 Mc. nearly all round the clock.

Today conditions are very different and although 14 Mc. DX is still worked, it is only there at short intervals of the day and not every day. The cause of this change is the state of the ionosphere which is affected by sunspots. These spots appear on the sun in varying numbers from day to day and the numbers have been recorded at the Zurich Observatory since the year 1750. The average daily numbers per year have been plotted and it is seen that they vary from a maximum lying between 50 and 150, to a minimum approaching zero in a well-defined cycle of approximately eleven years from maximum to maximum.

It has also been found that the maximum usable frequency (m.u.f.) varies directly with the sunspot number, so that when the sunspot number is a maximum, DX conditions are best; and at a minimum, DX conditions are worst.

1947-1948 was a time of sunspot maximum and we are now approaching a minimum. The prediction charts published in "Amateur Radio" have shown a corresponding decline in m.u.f. over this period. In "QST" of December, 1947, there appeared an article by Kenneth A. Norton, of the Propagation Laboratory, U.S. National Bureau of Standards, on the effects of sunspots on high-frequency transmission, and from curves given in this article, the recent maxima and minima have been taken as follows—

Minima	Maxima
1923	1928
1933	1938
1944	1948

The next minimum is predicted for 1954-5. It is interesting to note that the last minimum occurred during the war

and was well past before Amateur activity recommenced, so that only old timers have operated through a minimum.

The 28 Mc. band is most affected by sunspots and it may surprise newcomers to know that, although a few enthusiasts kept trying, no International DX was reported on 28 Mc. from 1931 until early 1935 and that "QST" of November, 1935, reports the making of the first W.A.C. on 28 Mc. during October, 1935, and in the same issue a contact between VK and Europe in October, 1935, is stated to be the first between these two continents on 28 Mc.

Not having experienced a previous minimum, many Amateurs who found 28 Mc. DX so good in 1936-39 and 1946-49, regarded this band, with its easily constructed rotary beams, as ideal and permanently settled there and dismantled their lower frequency antennae.

What can we expect in the next few years? In accordance with sunspot predictions and charts given in the "QST" article, after this summer (1951-52), there should be no F² DX on 28 Mc. until the summer of 1955-6. Sporadic E reflections may permit occasional Interstate working, but otherwise the band will be just a local band.

14 Mc. DX will still be worked during the minimum, but generally only on a few days of the month and at the most favourable time as predicted by the m.u.f. charts. A lot of listening per contact will be required.

7 Mc. being less affected, may be the best DX band in the next few years. If rotary beams were possible on forty, this would be a good DX band at any time, but there are other types of antenna which are capable of "stretching out" signals. A ground plane antenna for 7 Mc. was described in "QST" of June, 1947, and if tall poles and plenty of ground space are available, a 7 Mc. 8JK fixed beam directed on Europe or North America would make an interesting experiment.

* 228 Hensman Road, Subiaco, W.A.

† 39 Glenhumpy Street, Woodville, S.A.

The Rothman System of Modulation

BY JOHN CLARKE,* VK2DZ

When new systems of modulation are first introduced, the Ham fraternity usually are very sceptical and want to know the whys and wherefores, and always ask, does it work?

The writer has tried this system with excellent results as many VK, ZL, and some DX stations will testify, and it is the writer's intention herein to outline briefly the theory of operation and its practical application to Amateur transmitters.

As we all know, there are two general types of modulation, namely—

(1) Variable efficiency systems where in the plate power input remains constant and only the efficiency of the tube is varied to achieve modulation.

(2) Constant efficiency systems which employ variable plate power input and modulate the plate voltage and plate current to achieve modulation by variation of these two factors.

Now the Rothman system comes under the second category due to the fact that modulation is generated as variations of plate current which thereby varies the plate power input.

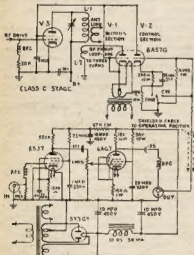


Fig. 1.—1 Kw. Rothman Modulator and Speech Amplifier.

THEORY OF OPERATION

The Rothman system of screen grid modulation achieves efficiency comparable to high level modulation and this is accomplished by the use of de-modulated r.f. feedback to the screen grid electrode of the class C stage in such a manner that a substantially constant r.f. angle of plate current flow is maintained during the modulation cycle, thereby preventing "efficiency modulation."

In the circuit diagram (Fig. 1), r.f. energy from the plate tank circuit V3, is fed to the rectifier V1 by means of

the pick-up loop L2. The de-modulated r.f. containing the modulation envelope, is then fed to the screen grid of V3. Control of this feedback link is effected by the tube V2 into the grid of which the modulation intelligence is introduced. The main requirements for this circuitry are—

Correct adjustment of feedback link L2;

Correct biasing of control section V2; Low plate resistance characteristics in V1 and V2.

Although tubes shown in Fig. 1 are new American types, suitable Australian types are available and the type 80 and 6CD6 can be used with excellent results.

The feedback circuit operates to re-inforce the modulating signal and a negative-going signal at the grid of V2 causes a rise in screen grid voltage. This rise in screen grid voltage causes the r.f. output of V3 to increase, thereby resulting in an increased screen voltage output from V1. At this point, the cycle again repeats at a very rapid rate, building up almost instantaneously to a point of equilibrium, bringing about a high average of screen grid voltage which is correct for any given value of plate power input during the application of the modulation cycle. For a positive-going signal at the grid of V2, the action is identical, but in the opposite direction and all screen voltage to the Class C stage is reduced to zero.

COMPARISON WITH STANDARD HIGH LEVEL PLATE MODULATION

In standard high level plate modulation, the modulating power is introduced in series with the d.c. plate input of the Class C stage. The resultant effect is to modulate the plate voltage between zero and twice the power supply voltage output. This modulation of plate voltage results in a directly corresponding modulation of plate current and for 100 per cent modulation, the power input to the Class C stage at the positive peak of modulation is therefore $2E_p$ times $2I_p$ or four times the carrier power level. At the negative peak of the modulation cycle, both E_p and I_p are substantially zero.

Now with the Rothman system, E_p is kept constant and all the modulation components must be generated as a variation of the plate current. It is therefore necessary that the d.c. plate voltage be equal to the sum of the d.c. and a.c. components utilised in normal plate modulation. This quantity is equal to twice the d.c. plate voltage used in high level modulation systems. Thus, with Rothman modulation the average plate current and screen voltage for constant carrier conditions is adjusted for one-half the values utilised in normal high level modulation. This is done in order to enable symmetrical modulation of these parameters without approaching tube saturation conditions, and at the same time allowing equal plate input through use of twice the plate voltage.

Since in Rothman modulation the side band component of the plate power input must be supplied by the Class C plate power supply, a 50 per cent increase of average plate current occurs with a 100 per cent modulation. The plate dissipation of the Class C amplifier tube is identical with that of high level plate modulation for the same plate input, since in the latter the modulation energy must be converted to side-band energy by the Class C tube.

In rating plate power input levels for high level modulated Class C amplifier tubes, it is common to decrease the allowable plate input from the c.w. rating by an amount equal to the high level modulating energy and this is done because of the fact that the d.c. plate voltage and current meters do not read the modulation component of plate power input since it is symmetrically disposed about the carrier power level. In Rothman modulation, however, the d.c. indicating meters always read the true total average plate power input. The allowable plate power input rating for Rothman modulation is therefore exactly equal to the c.w. rating for the tube used.

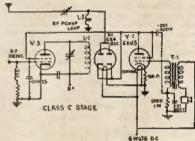


Fig. 2.—100 Watt Rothman Modulator.

COMPARISON WITH STANDARD SCREEN OR CONTROL GRID MODULATION

Rothman modulation differs from the ordinary screen or control grid modulation in that efficiency modulation is prevented by the maintenance of a constant r.f. angle of plate current flow in the Class C amplifier stage. Accordingly, the generation of side-bands is accompanied by a corresponding rise in plate power input. This characteristic is not true of ordinary control grid or screen grid modulation which maintains a constant average level of plate input and generates side-bands by modulation of the angle of plate current flow, e.g., efficiency modulation.

SUMMARISING

At this stage the reader no doubt will say "how do we obtain the same plate power input with the Rothman system as compared with high level modulation, under comparison?"

Assuming we have a 50 watt plate power input to the Class C stage with 600 volts on the plate at 100 Ma. plate current reading, we would probably

* King Street, Newcastle West, N.S.W.

have somewhere around 200-250 volts on the screen. Now with the Rothman system, it is necessary that the d.c. plate voltage be equal to the sum of the d.c. and a.c. components utilised in normal plate modulation and this quantity, as previously explained, is twice the usual d.c. plate voltage, although in practice it is found that an increase of 50 per cent. of the plate voltage will give excellent results. For example—

High Level:

600 v. (Ep) × 100 Ma. (Ip) = 30 watts

Rothman:

1200 v. (Ep) × 50 Ma. (Ip) = 60 watts

At this point it is well to bear in mind that the only source of d.c. screen voltage supply to the Class C amplifier tube is by means of voltage supplied by the rectified r.f. taken from V1 of Fig. 1.

MOBILE EQUIPMENT

Fig. 2 shows a Rothman modulator for 100 watts plate power input which although shown as a complete mobile unit due to the fact that it is d.c. operated, can easily be changed over for a.c. operation to meet the requirements for the standard 100 watt transmitter license as applied to Australian Amateurs. The circuit is straight forward and it works well. The writer has used this modulator, which only measures 4 inches by 4 inches by 2 inches deep, with great success to modulate his 100 watt Class C stage. Here again Australian type tubes can be used, the principal requirement being low plate resistance characteristics.

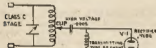


Fig. 3.—Alternative Method of Coupling R.F. to Modulator.

ADJUSTMENTS

1. Disconnect your screen supply altogether from the screen grid electrode.
2. See that your plate voltage to the Class C final tube is at least half as great again as that used with high level modulation for the same plate power input.
3. Back out your aerial coupling link to minimum.
4. Tune the final tank for resonance and you will notice that the resonance point will be indicated by the maximum plate current reading and not the usual

dip, this being because the screen grid voltage has been removed.

5. Couple the r.f. pick-up coil (attached to the de-modulator of the twin triode) to the cold end of the Class C stage and adjust same until the screen grid voltmeter reading shows half the voltage stated by the manufacturer's chart in respect of the plate voltage applied and this voltage must be obtained by application of modulation, i.e. whistle into the microphone at a constant level and adjust the pick-up coil until you obtain the required screen grid voltage.

6. Now couple your antenna coil to get a rise in plate current and when the plate current starts to fall off, this is the point at which the coupling to the antenna is correctly adjusted.

7. Don't be misled by small plate current readings because that shown on the meter is only the average value, the peak being twice that shown. However, if you have an aerial ammeter or pea lamp, you will see the energy that is being transferred to the aerial and when you apply modulation (speech), you will see the terrific increase in this energy due to the audio voltage adding to the de-modulated screen grid voltage and thereby varying the r.f. output of the transmitter.

The adjustments might seem complicated, but they are really quite simple and no difficulty should be experienced and once you get the correct settings, it is all plain sailing.

Unlike plate high level modulation, the plate current will kick about frantically, due to the modulation in this system appearing as variations of plate current.

LIMITATIONS AND SPECIAL REQUIREMENTS OF THE SYSTEM

The degree to which Rothman modulation can approach 100 per cent. is affected by the screen characteristics of the Class C amplifier tube used. With tubes possessing a reasonably high screen to plate transconductance, modulation or percentages between 90 and 95 per cent. are readily obtained. The plate power supply for the r.f. stage must be designed for twice the voltage normally used and must be capable of an output equal to the sum of the carrier and side-band components of the plate power input to the modulated Class C stage.

Care must be exercised in adjusting the feedback link to insure that the screen voltage at the peak of the modulation cycle does not approach screen

saturation. This is necessary in order to prevent excessive screen dissipation and efficiency modulation with resultant decrease in plate efficiency.

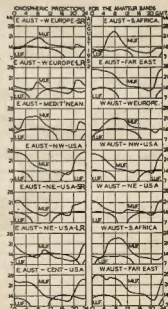
Since the degree of output coupling to the r.f. load affects the amount of energy in the plate tank and therefore the screen feedback link, adjustment of output coupling and feedback coupling are interdependent.

Plate resistance of the control and rectifier tubes should be low, about 500 ohms being ideal.

ADVANTAGES OF THE ROTHMAN SYSTEM

1. Elimination of bulky and heavy high level modulation components including Class B modulators, drivers, and modulation transformers.
2. Consolidation of plate power requirements into a single power supply at twice the normal impedance, thereby enabling a saving in space and weight.
3. Capable of linear modulation at extremely high modulation frequencies with all the flat response characteristics of resistance coupled operation.
4. Elimination of separate screen power supply or power wasting voltage dropping or dividing resistors.
5. Since screen power is generated only under conditions of resonance, protective fixed bias is unnecessary and superfluous.
6. Controlled carrier operation is readily obtainable with extremely simple circuitry.
7. Negative feedback of the de-modulated intelligence is easily accomplished by merely connecting a suitable network between the plate and grid electrodes of the control tube as shown in Fig. 2.

PREDICTION CHART FOR AUG., 1952



ANNOUNCEMENT

The exclusive manufacturing and distributing rights for Australia and the Australian Patent Application for . . .

The Rothman System of Modulation

is held by the undersigned, who will shortly be manufacturing a modulator, type A1, suitable for 100 watt transmitter, and Australian conditions.

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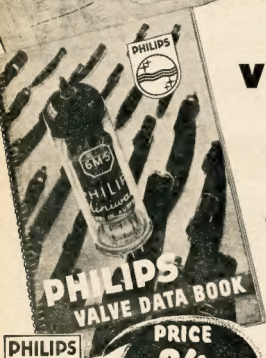
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AMATEUR CALL SIGNS

FOR MONTH OF MARCH, 1952

ADDITIONS

VK— New South Wales
 2HX—T. L. Somers, 2 Ingham Av., Five Dock.
 2IG—L. J. Stanley, 14 Railway Av., Eastwood.
 3VX—V. E. Hume, O.T.C. Radio Station, Carlingford.
 2PO—R. B. Reeks, 7 Wheeler St., Carlton.
 2ATO—J. D. Thorntwaite, 23 Collingwood St., Drummond.

Victoria

3ME—E. C. Cameron, c/o. 3LK, Lubeck.
 3ARC—R.A.A.F. College Radio Club, R.A.A.F. College, Point Cook.

Queensland

455—A. Shawmitch, 54 Davenport St., West End, Brisbane.
 4TL—D. M. Robinson, 47 Dunnellan St., Greenslopes, Brisbane.

South Australia

50C—L. O. C. Baker, 7 Lillian St., Prospect.
 59D—R. S. Anon, 78 Oval Av., Woodville 8th.

Western Australia

6TR—T. W. Reed, 17 Auckland St., Nth. Perth.

Tasmania

1BC—B. D. Clark, Short St., Lindisfarne.

Territories

1AE—G. Major, Macquarie Island.

ALTERATIONS

VK— New South Wales
 2BA—17 Seidler Pde., Baignswell.
 2FI—"Windward", Buena Vista Av., Wentworth Falls.

2GL—C.O. Quantas Airways, Operations Dept., Mascot.

2LY—"Netrella", Rodova St., Katoomba.

2OX—9 Glamis St., Kingsgrove.

2QY—35 Cliffbrook Pde., Croydon.

2ABY—Lot 63, Norton St., Bass Hills.

2ADA—25 Cathcart St., Fairfield.

Victoria

5BP—Howling Loose Bag, Rutherglen.

5GB—755 Burwood Rd., Hawthorn, E.S.

5GV—Ruda St., Doncaster.

5HD—5 Ackeringa Cres., Black Rock, S.E.

5PD—C. Henty & Campbell St., Barwon Heads.

5RA—71 Tennyson St., Edwood.

3RF—93 Latrobe St., Warragul.
 3WK—35 Lubrano St., East Brighton.
 3AAB—37 Gordon Cr., Northcote, N.E.
 3AAK—"Coolinda", May Rd., Sydnal, via Glen Waverley.
 3ATD—c/o. Station 3BO, Bendigo.

Queensland

4FM—41 Little St., Cairns.
 4KR—Emmer Rd., North Mackay.
 4WI—c/o. A. Harris, 15 Turner St., Windsor, Brisbane.
 4XW—10 Ashton St., Camp Hill.

South Australia

5MK—55 Lynton Av., Millswood Estate.
 5MN—17 Railway Ter., Kadina.
 5MP—2 Dew St., Kent Town.

Western Australia

6CN—Moore St., Killeberrin.
 6FW—117 Hamilton St., Bassendean.
 6GY—10 Kipling St., Narrogin.
 6RB—152 McDonald St., Joondanna Heights, Mount Hawthorn.
 6RT—School House, Bindu Bindu.
 6UF—c/o. D.E.S., W.A. Govt. Rlys., Geraldton.
 6VR—R.A.A.F. Station, Pearce.

Tasmania

7KA—Lenna St., Rosebay, Lindisfarne.

Territories

1RF—Heard Island.
 1RG—Macquarie Island.

DELETIONS

N.S.W.: VKs 2AFL, 2ATL (now operating under VK2HDI).
 Vic.: VKs 3ADE, 3AFL (now operating under VK1JJB).
 Tas.: VK1JB.

FOR MONTH OF APRIL, 1952

ADDITIONS

VK— New South Wales
 2LJ—L. J. Coupland, 135 Morgan St., Beverly Hills, Sydney.
 2ATF—J. S. Price, R.A.A.F. Station, Richmond.
 2AUA—M. C. Carpenter, 3 Heathcote St., Rockdale.

Victoria

3ALZ—L. F. Berwick, "Courtney Park," Murchison.

South Australia

5OP—P. S. Roper, 27 Miles Ter., Nth. Adelaide.

Western Australia
 6MR—H. T. Mulder, Station: Aboard M.V. "Sabina", Post: 4 Tyrell St., Nedlands.
Territories
 1EM—E. L. Macklin, Macquarie Island.

ALTERATIONS

VK— New South Wales
 2AO—22 Targo Rd., Kogarah.
 2HP—32 Watlie St., Killara.
 2LJ—12 Anzac St., Canterbury.
 2MZ—44 Linbourn Av., Croydon Park.
 2TZ—36 Kardina Rd., Clifton Gardens.
 2UM—44 Caldes Rd., Burwood.
 2VH—114 Gipps St., Wollongong.
 2XP—Girraween, H.M.B. 321, Dalton.
 2ZH—81 Beechworth Rd., Pymble.
 2AG—29 Meskin St., Merrylands.
 2ABH—Lot 61, Cobbagtree Lane, Fairymeadow.
 2AJE—38 Gannon Rd., Carlingbah.
 2AKK—27 Cecil St., Ryde.

Victoria

3DV—32 Scott St., Dandenong.
 3KH—22 Neilson St., Burwood.
 3SF—375 Portesue Av., Seaford.
 3ABP—28 Lewisham Rd., Windsor.
 3AGP—29 8th St., Parkdale.
 3AGX—40 Birdwood Av., Dandenong.
 3AJI—165 Glen Eira Rd., East St. Kilda.
 3AOL—34 Bellerine St., Geelong.

Queensland

4GW—15th George St., West Bundaberg.
 4LK—Anne St., Charters Towers.
 4LT—Fitzroy St., Nanango.

South Australia

5AC—13 Hughes St., Woodville.
 5DG—148 Raglan St., Harcourt Gardens.
 5VC—Cr. Montacute & Moorland Rds., Hectorville, Adelaide.

Western Australia

6AR—9 Elizabeth St., Kalgoorlie.
 6CM—30 McDonald St., Kalgoorlie.

Tasmania

7WI—27 Bishop St., New Town.

Territories

9RO—S.D.A. Mission, Box 11 P.O., Lae, T.N.G.

DELETIONS

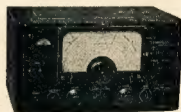
Vic.: VKs 3KF, 3VC.
 Qld.: VK4KM.
 S.A.: VK5EK (now operating under VK2ATF).
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Television Questions and Answers

Questions on television, submitted to VK3ADA, after being answered by post, will be anonymously published and again answered here, as space permits, to benefit other readers.

Q.—Ref. Part II. As a photographer, I noticed that the design of the Emitron camera does not permit the lens to be placed close to target, as shown in Fig. 1. Apparently this camera can use only lenses of large focal length, with the inherent disadvantages of same. Surely all television cameras don't suffer this limitation. How can it be overcome?



Fig. 1.

A.—You are quite right. The disadvantage you mention is due to the functions of photo-cathode and scanning target being combined on the one surface, and is overcome in later types of camera tube by separating these two functions. Perhaps the simplest of these tubes is the Super Emitron, outlined in Fig. 2.

In this tube, the photo-cathode consists of a small sheet of transparent mica, or glass, coated with photo-emissive material and placed against a flat "window" in the tube, so that the optical lens can be placed as close as required.

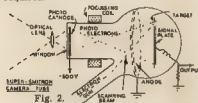


Fig. 2.

Photo electrons, after being liberated from this cathode (by light from the scene) are attracted by the anode towards the target, on to which they are focussed by the coil, just as the optical lens focusses the light rays on to the cathode.

Upon striking the target these electrons dislodge others from the target's surface, so that the "charges" produced by the light are "transferred" from the photo-cathode to the scanning target, from which the output is obtained just as in the Emitron tube (which, by the way, is not obsolete. It still has some advantages).

The Super Emitron uses a method of amplification quite different from those with which we are familiar. As each photo-electron strikes the target at high velocity, it dislodges not one, but several electrons so that the charges on the target are greater than those on the cathode. In other words, the signal is amplified, making the camera far more sensitive than the Emitron.

This method of amplification, called "electron multiplication," is used quite extensively in television cameras, but for simplicity's sake, the subject has

been purposely omitted from this series, since it does not concern the Ham's angle on television.

Q.—I've read that when an object moves rapidly across a television screen, it appears distorted in shape. Why?

A.—Consider the square object in Fig. 3 moving from left to right. Suppose that when the camera commences scanning its top line, it is in position ABCD, but by the time its base line is scanned, it has moved to position HGFE. Now, on the receiver screen the top line will be reproduced at position AB, and the base line at EF, so that instead of being square, the object will assume the "rhombic" shape ABFE.



Fig. 3.

This point has often been raised in support of 60 field/sec. systems, but in reality, even in a 50 field/sec. system, it is far from troublesome; in fact you probably would not notice it if you had not been told.

The distance DE is that travelled by the object (on the screen) in about one-hundredth part of a second or less, and for this to be appreciable, the object would have to be moving so fast that its shape would not be clearly discernible in any case.

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Z969-1 30 Henry 80 Ma. Power Chokes	£3/17/6
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VK4	1	2	-	3	5	5	4	21
VK3	2	1	3	-	5	4	6	21
VK5	1	3	4	3	-	5	6	21
VK7	2	1	4	3	5	-	6	21
VK8	1	2	3	4	5	6	-	21

Examples:

2	00	00	00	VK3	01
4	00	00	00	VK4	01

N.Z.A.R.T. and W.L.A., the National Amateur Organisations in New Zealand and Australia, invite world wide participation in this year's VK-ZL DX Contest. Rules for Overseas Stations are the same as for 1951 and may be summarised as follows.—

When: C.W.—24 hours from 1200 GMT, Saturday, 4th October, to 1200 GMT, Sunday, 5th October

Phone—24 hours from 1200 GMT, Saturday, 11th October, to 1200 GMT Sunday, 12th October.

Scoring: One point will be scored for each contact on a specific band with any VK-ZL district. The final score will be derived by multiplying the total contacts on all bands by the total number of VK-ZL districts worked on all bands. VK-ZL districts are: ZL1, 2, 3, and 4. VK-ZL * 4 = final score.

Serial Numbers will consist of six figures (five figures for phone), made up of the RST report plus three figures which should commence with 001 and increase by one for each successive QSO, i.e. 002 003 004 etc.

Legs. (a) Must show in this order: Date, time in GMT, call sign of station contacted, serial sent, serial received, band. Please underline each new VK-ZL district when contacted. PLEASE use a separate log sheet for each band.

(b) Summary Sheet to show: Call sign, name and address (please in block letters), details of rig, Total score by showing total of districts worked on all bands and total contacts on all bands. (Districts x Contacts equals Total Score), and signed declaration that rules have been observed.

Awards: Attractive Certificates to the highest scorer in each Country (each call area in the U.S.A.). Other Certificates will be awarded depending upon the number of logs received from each Country.

Legs should be posted to reach N.E.A.R.T., Box 488, Wellington, N.Z., on or before 23rd January, 1953. (Mark envelope VK-ZL Test.)

Listeners' Section as before. To count for points, a VK or ZL station must be heard in a Contest QSO and the following noted in log: Date, time in GMT, call of station heard, call of station being called, RSIT of station heard, serial number sent by the calling station, band. Scoring is on same basis as for transmitting section, and log should be similarly made out.



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Page 13

equipment, experiences on Heard Island (by Kevin Johnston, ex-VK1KJ), x-ray equipment, "My Trip to England" (6SWs) and antenna patterns. The Lecture Co-ordinator has full control of the situation and you are promised some really tip-top lectures for the remainder of the year.

There has been some discussion lately over the air and over counters and other places where Hams foregather about the need for the Institute to help those experimenters who desire to build their own test and measuring equipment for components of known values to a reasonable degree of accuracy. Various schemes have been put forward and at last Council has decided that rather than the Institute purchase standard resistors, condensers and the like with the attendant risk of damage in transit, it will set up a standard measuring service. This means that if you are building a multimeter, a measuring bridge or any other piece of gear intended for measuring something, then the W.I.A. will measure your resistors, capacitors or inductors for you to within very close tolerances—certainly close enough for Amateur standards. But if you've just bought a 1981 model broadcast set at an auction and junked it—and you can't read the values on the components—don't bother with the measuring service is for parts needed for measuring equipment only.

Reports from the Spy Ring. A recent surprise visit was made to the home of the operator of 6HT. Harry was heard using what appeared to be f.m. Another Ham-type comes back to 6KW in the morning. "I never believed it was you. Yet Barry looks a decent, clean-living lad and too—he's a possessor of the 'Buccie'." We met some VK1 members at the recent comeback on 7 Mc. although it seems Collin is more interested in the v.h.f.s. and in mobile working nowadays.

Talking of mobiles—did you see the recent "QST" article about the "California Kilowatt" on wheels? 800 watts input mobile! And it takes me a awful of junk to put 33 watts into a humble 807 on 40! A recent mention in this column of the VS1AD/VK6W4 technical pow-pows on 14 Mc. has brought forth the information that they're still going on every Sunday mornings. VS1AD says VK6s don't get up early enough in the mornings. Apparently it's not so much the sun as the moon that informs them that they're still up. Now it's 6WT ("). And now sir, have you any statement to make to the Press on t.v. or not t.v.? "We were heard putting out a signal on 7 Mc. but that's all. It's more than I dare. Another backslider to return to the fold of 7 megacycles is Bill 6MB.

The leaves of the grapevine have been rustling in the effect that the wind is blowing in the room. No doubt with some genuine imported cray-pots for his many 30 mc cronies. 6RU is re-building and the plant includes a new exciter to include 21 mc. Glad to hear Jim for the "R.D.'s". I am told that Tom 6TR now has the key to the situation and a recent issue contains a well-kept newspaper displaying a picture of him complete with three charming YLs, receiving the "key of the door." Careful Tom, or Ham. Radio will be taking a back seat. Blake 6GS has been on 7 Mc again lately after a long absence. But I believe that can't be taken as a sign of inactivity for he's still keen as ever on 6 mc and works there often. A recent visitor to his old home town was 6FC from Nerroga. Frank was heard from 6BO's shack but as no visitors arrived, Rolo closed down. Was the competition too great, Rolo? (Must have been for he didn't send me any notes this month. Black mark, Hetherington).

Clarrie 6LL is an exclusive band Ham. But my spy doesn't know whether it's exclusive 10 or ditto 30. What happens if all bands come good at once? "There's another band I've switched Tx on the slipway—ABC goes modern. Have they converted you at last, Bert? Don't know what Ham 6L is coming out of. But here, fuses there, safety-interlocks to the left of 'em, completely screened rigs to the right of 'em.

A Ham with a real "whinger" is 6RW. Bob had one dose of the "flu" and then another right on top of it! His radio silence would have been broken ere this had not the germ decided to attack twice. My sympathies. It was rotten luck. 6JW has been experimenting with a new modulation system but unfortunately the contact I had with him was marred by local (i.e. motor) QRM. Try again now the a.c. is on here, John? They tell me Dick 6VZ is trying, in his hand at making relay systems. Right on! at the right price doesn't arrive from elsewhere. Never mind, Dick, 6L's going to lecture about 'em—in December! 6KW, once one of the most consistent of DXers, is now earns the reverse of that title. What's due to happen, Ron? And where and when?

ACCURATE FREQUENCY TRANSMISSIONS FROM VK3WI

The next Accurate Frequency Transmission will take place on Thursday evening, 28th August, 1952, on 3.5 Mc. Details of the operating procedure and times of operation will be found on page 8 of the January, 1952, issue of this magazine.

A distinguished visitor to VK6 a few weeks ago was Dr. G. H. Munro, chief of the Radio Research Board of the C.S.I.R.O. who lectured before one or two august bodies (not you, Pansy! Sit down!) and also made the trip to the Ionosphere Sounding installation at Watheroo. Among VKs who met and talked with Dr. Munro were 6MO and 6GH. The latter almost a "school-mate" of the worthy doctor's in England at a time when both were doing radio research work. Among some interesting recent discoveries revealed by Dr. Munro was the fact that the ionosphere possesses ripples in semi-cylinder shape which move in certain directions during winter and then appear to reverse during summer. It is to be hoped that 6GH will either persuade Dr. Munro to communicate some of these findings to the W.I.A. or that George himself will prepare a lecturette on what promises to throw new light on propagation.

TASMANIA

A most pleasing feature in connection with the July general meeting was the excellent attendance. The meeting was held at the usual venue on Thursday, 3rd July, under the chairmanship of Mr. Bob O'Mary. As the meeting progressed, it became evident that there was standing room only at the rear, and it was indeed most encouraging to see that the representative gathering. The meeting admitted two more associate members to the ranks—namely, B. L. Mowry and A. N. Davis, both of Hobart. We extend to them a hearty welcome, and we hope that their "transit time" between associate and full membership will be of short duration.

After a little more general business, all present sat back and prepared to absorb the "gen" on TRI4142A 2 mc conversion, as deliv-

ered most capably by TOM, 7LE and 7BJ. The Tx side was handled by Bob and I, and whilst Joe took care of the Rx side. Just about all aspects of the conversion were covered, and must have been of great help to members who, possessing this equipment, or contemplating purchase thereof. At the conclusion of the lecture, a vote of appreciation by 7LJ was warmly endorsed by all present. Incidentally, the last I heard of Joe in connection with 144 Mc., was that he had just purchased an armful of 6AT6s and was really going to town in a big way.

By the time this appears in print, the R.D. Contest will be just around the corner, so I shall take this final opportunity to alert members in this regard. A concerted effort is required from as many members as possible, and it behoves all who desire to stand out in performance, to see that their gear is fit and able.

Another point which I feel should be brought to the attention of southern members—a point which, I am sure many have overlooked, is as follows. The regular weekly operation of 7WI makes certain demands on the time of the operator concerned, and in some cases, the broadcasts are carried out at great inconvenience. It must be most discouraging to carry out a broadcast under such conditions, stand by and listen to acres of silence. Northern and North Western members always rally when receiving conditions permit, but the response from Southern members is frequently nil. Perhaps many feel that, having no business for 7WI, a call is rather idle when, on the contrary, I know that all calls are welcome. A short call, if exchanging nothing more than signal reports, at least tells 7WI that he is getting out, that someone is listening, and he is not entirely wasting his time. In the 80 mc band, 3674 Kc. has been used as well for the last three or four broadcasts, and the next contact 7WI has on that band will be the first. Four more broadcasts will have taken place before members read this, and if the situation remains unchanged, well I can only say "what about it chap?"

7KA, with shack under the house, is finding ambient temperature anything but to his liking. Should be quite a good excuse Ken, for putting a compact, small 2 mc rig in the living room. Think it over, and let us know when to listen. Secretary TFF seems to have overcome the problem of how to get the rig into the house with one swift move, and could possibly use prevalent wind to drop a hint or two. I'll bet this copy of "A.R." however, is not left lying around the TVF mesa.

7RY is well advanced with the construction of a new frequency meter plus 100 Kc. standard. I am amazed that you still have that 160 Kc. rock free! I have seen many evasive eyes including mine cast upon it. Of course, if we can spirit it away with the frequency meter wrapped around it—well, so much the better. Caught a fleeting glimpse of Leon 1JP behind the wheel of a certain green vehicle. Guess we

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had better attach the P.M.G. label. Leon, or someone is bound to ask whether it was the green card. Anyway, long time no hear son. TRK is now resident in Hobart, and, while I have no knowledge of future plans, trust he will soon be active again.

TCJ is taking kindly to the idea of a small portable rig, and the possibilities thereof. Suggesting necessary, course of day of the day, I leave to the idea Alan, preferably before the R.D. Contest, because we can sure use the extra points. Tommy Trk has just completed a new rig with QX TRX, and is now in a struggle hold on a SMP, and Brian TRX, who are just not hearing you these days. Time just runs on, and the world goes on.

That's all for this time. In closing I might add that any news of general interest is always very welcome—so don't be shy.

NORTHERN ZONE

The June meeting of the zone was held at the Trades Hall on Friday, 13th. A very fine lecture was given by TFF, his subject being the various methods of communication and safety devices necessary, course of day of the day, I leave to the idea Alan, preferably before the R.D. Contest, because we can sure use the extra points. Tommy Trk has just completed a new rig with QX TRX, and is now in a struggle hold on a SMP, and Brian TRX, who are just not hearing you these days. Time just runs on, and the world goes on.

Once more I find myself in the role of deputy to our correspondent, TXX, who at long last moving into his new QTH. Chris does promise bigger and better things when settled in. T.L. and I are planning that we go into making our air lines something to be proud of. A vote of thanks was ably moved by our President, TAM, and recorded in an appropriate manner.

TDS is evidently still alive and kicking. I heard him the other night on 7 Xds. off with a nice sig. Don't see much of you these days Bill. Get Peter to tell you the date of the meeting next month. Here at TRK the main interest has been an electronic key which probably explains some peculiar on-morse-like characters emanating from the station. I have heard of this before, and it really works like a charm. The only drawback with it now is the operator, but he'll learn—hope so. I am anxious to hear that that TRG is on the way home from parts distant and should hit VK about the time this see print. Len will be very welcome back here and we look forward to hearing some details of his travels abroad. Don't forget, the date to keep clear in August is Friday, 8th.

NORTH WESTERN ZONE

Our congratulations go to Syd McDow who is now a fully qualified Ham and is operating under the call of 7BF with 100 watts and was heard with TWA recently working VKJ and VKT. I am sure that he will be heard on the air soon is Murray Richardson who has passed and is awaiting his ticket. Fine business. It is always the A.I. in studying radio, and a view to detecting many things. The bands have been very quiet here lately except for odd occasions when there are local QSL stations and on other days. One of our meetings on occasions, saw VKB work 30 different countries in 15 hours. Our monthly meeting, which was held on 4th July, was postponed a week to suit members.

CORRESPONDENCE

The opinions expressed in these letters are the individual opinions of the writers and do not necessarily coincide with those of the publishers.

FEDERAL COUNCIL

33 Lambton Rd., Waratah, 2N, N.S.W.
17th June, 1952.

Editor "A.R.," Dear Sir,

"This said that my true word is spoken in jest and no intention in Federal Notes in your June issue of VKS Delegate, Ron Hugo's, merism and hypnotism at the 1952 Federal Convention, and I am sure that you will have made Y.E. instigated into the proceedings. As a guest of Federal Council at the Federal Dinner in my capacity as President of the Hunter (Newcastle) Division, I am sure that you will have become ill to criticize my hosts, but, after all, we were invited to sit around and listen.

At the outset I must confess my ignorance of the Federal Constitution, but despite that lack, certain principles are fundamental. What astounded me most was that F.E. had a vote in the Executive and F.E. Delegate voted as directed by Federal President.

Constitution or no constitution, is not Federal Council, but by the creation of the Federal Divisions to implement the mutually agreed wishes of those Divisions? Why, therefore, should F.E. have a vote any way, or no to what the constitution? Divisions desire to be done. Such a situation seems to my humble intellect to be both ludicrous and Gilbertian and a denouement of the affairs where our servants become our masters.

And, when all is said and done, what earthly use are Federal Conventions on the existing basis? The agenda for the year, and the moot is circulated to all Divisions and after consideration by their members, the respective delegates are instructed how to vote.

That being so, why to the expense of a gathering of the clan from far and wide unless delegates have power to vote as the merits of the arguments advanced for and against may convince them as thinking individuals.

Assuming therefore that black magic did not operate and that delegates were free to vote as convinced by logic in debate, and I do presuppose that every motion on the agenda must receive the courtesy of a formal seconding that the Executive is asked to consider beyond question that several motions were stillborn because of the binding of delegates.

So through your columns, I crave leave to cry "to my aid ye pounders of brass, so that all may be glad in the end, and F.E. and its hosts be discomfited with the keen edge logic and reason.

—LIONEL T. SWAIN, VKKCS.

33 Lambton Rd., Waratah, 2N, N.S.W.

17th July, 1952.

Editor "A.R.," Dear Sir,

I am in receipt of a letter dated 3rd inst. to a Victorian Division letterhead from one J. Hurley who styles (her) himself (?) Administrator Secretary, acknowledging my own behalf, my communication of 17th June.

Since addressing you on that occasion, I have been reminded of the letter from J. Hurley, and I am sure that you will be interested in my communication of 17th June.

That F.E. has, through its policy book, taken upon itself the right to censor all criticism so, unfortunately, members of the public, from every and sundry, are under the impression that it considers itself to be a different class (or sand?) to its overseas counterparts.

As a member of the Eastern Division, and reader of "QST," I have noted no reluctance on the part of other organisation to print letters containing any criticism relating to the F.E. and I suggest that F.E. would be well advised to permit the columns of your journal to be used as a "safety valve" for the feelings of members, albeit always retaining the right of reply.

The lack of any such letters in your columns, due to this guardianship of our Amateur "sides" can only suggest to anyone who contemplates writing any criticism, that the F.E. is not and he is apparently the only misguided one with a chip on his shoulder.

The ultra-conservation exhibited by members of F.E. at the Eastern Convention, gave me furiously to think and the adoption by them (or it) of any attitude of papal infallibility has appeared to me as a serious obstacle to the F.E. and that when the growing dissatisfaction in Amateur circles boils over, they (or it) will plausibly blast "my, my, no one didn't tell us."

I therefore look forward to the letter published in your August issue (what a fitting adjective) with any informative comment F.E. designs to offer.

—LIONEL T. SWAIN, VKKCS.

(Federal Executive welcomes Mr. Swain's letters and has no more hesitation in publishing them than of many others in the past. There are only two known instances when this Executive has caused any member writing to the publishers' correspondence or Divisional notes—to be withdrawn from publication.

On these particular occasions, the Executive acted on the directions of the Federal Council as laid down from time to time as policy. The policy directive under which the Executive acted was in fact a resolution of the Federal Council by Mr. Swain's Division in 1950, and concerned the responsibilities of Federal Council towards its members in the Radio Division. The responsibility concerning the reasons why certain comments were withdrawn on these occasions reads: "any matters which might prejudice relations between the F.E. or between Amateurs generally." The Executive has never withdrawn constructive, informative or misinterpreted information from publication.

A perusal of overseas journals will indicate a strong tendency to adopt the same policy; seldom, if ever, does one see facetious criticism or personal criticism published in these journals.

Mr. Swain's criticism of Federal Executive—and inadvertently, the Federal Council too—concerns the manner in which certain matters referred to in his correspondence, and, not only ignorance of the Constitution (which he readily admits), but ignorance of the manner in which the Executive and the Council function under its Constitution.

Unfortunately, due to the necessity to curtail space in the services of the F.E. in not portable, I publish the rather lengthy reply required to satisfactorily answer the various points arising from Mr. Swain's letters; the Executive has written directly to Mr. Swain.

However, it seems evident that quite a few members of the W.I.A. are not aware of certain details of the functioning of their own Institute, so Federal Executive proposes, in its columns on the Federal Notes page, to acquaint members each month with some of these details. If the members don't like the mechanism by which the Federal administration works, then it's in their own hands to change it. In the future, the Executive will continue to work for the Council and its Executive body works to the Constitution you approved of from time to time. —Federal Executive.]

VICTORIAN V.H.F. FIELD DAY CONTESTS

Editor "A.R.," Dear Sir,

I notice with airdrie amusement that the v.h.f. gang are going to cease v.h.f. field day this year. I am sure they can last at interest.

Has it stopped to think why the so called lack of interest exists. During the past v.h.f. field day year, 301, 34PF and 3JC were out every day after travelling some 40 miles to a good location. Signals came through at good strength but few were interested to work a country portable station.

One v.h.f. man, considered to be one of THE v.h.f. men, went so far as to say, publicly on the air, that he just wasn't interested in working country portable stations.

If members of the Melbourne group express themselves so, how can it be expected by the same group that country stations take an interest.

Same man was reported to be moaning over lack of reports on his v.h.f. transmissions.

VKJ v.h.f. have already asked co-operation of the v.h.f. gang in this zone for the coming year, and I am sure they will be very interested when as an after thought you tell your teams north. This, of course, will not include the few regulars who always were obliging.

—VKKCS, N.E. Zone Correspondent.

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